

# International Space Station Onboard Training Media Requirements

## International Training Control Board Onboard Training Working Group

Baseline

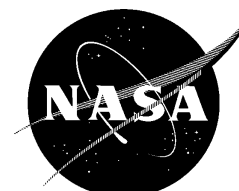
December 1999



*Russian  
Space  
Agency*



National Aeronautics and Space Administration  
International Space Station Program  
Johnson Space Center  
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**SSP 50503**  
**Baseline**

**INTERNATIONAL SPACE STATION PROGRAM**

**INTERNATIONAL SPACE STATION ONBOARD  
TRAINING MEDIA REQUIREMENTS**

**DECEMBER 1999**

**PREFACE**

**INTERNATIONAL SPACE STATION ONBOARD  
TRAINING MEDIA REQUIREMENTS**

Onboard Training (OBT) products currently developed as of the baselined date of this document are exempt from compliance to these requirements. OBT products in development as of the baselined date will be considered for waiver based on supporting documentation (development schedule and differences to this document) and confirmation to work on the Station Support Computer (SSC) to meet integration requirements. However, all new products and major revisions to the OBT user interface shall adhere to these requirements.

## International Space Station On Board Training Media Requirements

December 1999

Approved by



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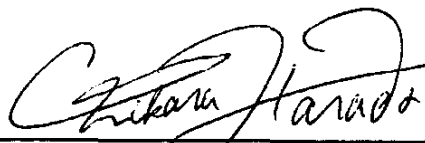
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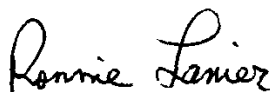
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## International Space Station On Board Training Media Requirements

December 1999

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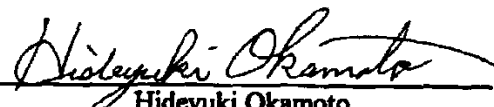


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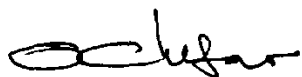
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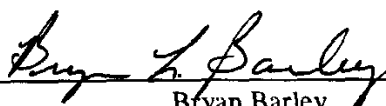
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INTERNATIONAL SPACE STATION PROGRAM

INTERNATIONAL SPACE STATION ONBOARD  
TRAINING MEDIA REQUIREMENTS

CONCURRENCE

DECEMBER 1999

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## **1.0 INTRODUCTION**

### **1.1 PURPOSE**

The purpose of this document is to define the user and system requirements, the constraints for the International Space Station (ISS) Onboard Training (OBT) development, and the operational environment under which OBT will be delivered.

The rationale for this ISS OBT Media Requirements Document is to minimize diversity and proliferation of interfaces, layouts, and styles, and to ensure compatibility and usability of OBT in the on-orbit environment. The requirements promote the ease of use in order to optimize crew learning efficiency and to minimize the risk of operator error and negative training.

### **1.2 SCOPE**

This document covers the requirements for ISS OBT methodology and media (e.g., Computer-Based Training (CBT), teletraining, video training, and simulator models).

This document does not define, specify, nor impose undue restrictions on courseware design and development activities internal to a Partner. It will provide a sufficient level of detail of user and onboard system requirements, constraints, and criteria from which Partner training management can define OBT technical specifications and implementation plans, which meet the requirements and criteria detailed in this document. OBT products currently developed as of the baselined date are exempt from compliance to these requirements. OBT products in development as of the baselined date will be reviewed for compliance with these requirements. However, all new products and revisions to the OBT user interface shall adhere to these requirements.

These requirements are invoked and shall apply to OBT planned for all increment crews beginning with the first permanent crew. Any training (proficiency, refresher, and just-in-time) onboard the ISS shall be subject to these requirements.

Documents, graphics, and other reference materials that are available electronically onboard the ISS and not used for OBT shall be maintained according to SSP 50253, Operations Data File Standards.

### **1.3 DOCUMENT CHANGES**

This document was written under the authority defined in SSP 50200-07, Station Program Implementation Plan, Volume 7: Training, and SSP 41184-01, Multilateral Training Management Plan - Volume 1. The International Training Control Board (ITCB) has delegated the responsibility for the development and management of the OBT program for the ISS to the Onboard Training Working Group (OBTWG) under ITCB approval. The OBTWG membership is comprised of representatives from each of the International Partners and Participants (IPP), the astronaut and cosmonaut offices,

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the ISS Payloads Program Office, and various ITCB sub-panels and working groups. The OBTWG, therefore, has the requisite structure and capability to determine the requirements for ISS OBT for approval by the ITCB. These requirements are described herein.

This document will be under configuration control of the ITCB once baselined and will have multilateral sign-off.

#### **1.4 ISSUES AND OPEN WORK**

Because of the complex and dynamic nature of ISS development and implementation, there can be unresolved issues concerning new or existing processes. Therefore, **<TBR X-X>** identifies these unresolved issues in the text. Table D-1, Matrix of Items To Be Resolved, captures the To Be Resolved (TBR) issues associated with this implementation plan. Processes associated with a TBR issue are not considered baselined operating processes until the issue is resolved and the implementation plan text is updated.

Not all processes have been defined when discussing International Partner (IP) roles and responsibilities. As this document evolves, the processes become better defined and are incorporated into the implementation plan. Therefore, **<TBD X-X>** identifies open work in the text. Table E-2, Matrix of Items To Be Determined, captures the To Be Determined (TBD) items associated with the implementation plan. Once the TBD information is defined, the correct text is inserted in place of the TBD in the document.

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**2.0 DOCUMENTS**

**2.1 APPLICABLE DOCUMENTS**

The following documents include specifications, models, standards, guidelines, handbooks, and other special publications. The current issue of the following documents is identified in the Program Automated Library System (PALS) (<http://issa-www.jsc.nasa.gov/cgi-bin/dsdl+/ORAP?-h+palshome>). The documents listed in this paragraph are applicable to the extent specified herein. Inclusion of applicable documents herein does not in any way supersede the order of precedence identified in Paragraph 1.3 of this document.

|                |   |
|----------------|---|
| SSP 41184-01   | Multilateral Training Management Plan - Volume I  |
| SSP 41184-02   | International Space Station Multilateral Training Management Plan, Volume 2 (Payloads)  |
| SSP 50011-01   | Concept of Operation and Utilization<br>Volume I: Principles  |
| SSP 50200-07   | Station Program Implementation Plan,<br>Volume 7: Training  |
| SSP 50253      | Operations Data File Standards  |
| SSP 50313      | Display and Graphics Commonality Standards  |
| JSC 36301      | International Space Station (ISS) Crew Training Catalog   |
| JSC 36343      | ISS Graphics Training Products Development Manual   |
| JSC 36381      | Operations Local Area Network Interface Control Document  |
| JSC 48531      | Station Support Computer Software Management Plan   |
| CB-99-085      | Crew Consensus Report for Fundamental Requirements for International Space Station (ISS) Preflight and Onboard Computer-Based Training Products |
| No Number      | ISS Lexicon   |
| No Number      | Windows Interface Guidelines for Software Design  |
| <b>TBD 2-1</b> | ISS Onboard Computer-Based Training Developer Guide   |

## 2.2 REFERENCE DOCUMENTS

The following documents contain supplemental information to guide the user in the application of this document. These reference documents may or may not be specifically cited within the text of this document.

**<TBD 2-2>**                      Robotics OBT User Requirements Document

No Number                      CD Library Ops Concepts

## 2.3 ACCESS FOR DOCUMENTS

Since many OBT products will be electronic, important reference documents will be available via the network. Table 2.3-1, Web Access for Documents, contains the locations of these documents via the internet.

**TABLE 2.3-1 WEB ACCESS FOR DOCUMENTS**

| URL  | Document Title   |
|--|--|
| SSP 41184-01<br><a href="http://iss-www.jsc.nasa.gov/ss/issapt/pals">http://iss-www.jsc.nasa.gov/ss/issapt/pals</a>                                    | Multilateral Training Management Plan - Volume I                                       |
| SSP 41184-02<br><a href="http://mole.msfc.nasa.gov/station">http://mole.msfc.nasa.gov/station</a>  | International Space Station Multilateral Training Management Plan, Volume 2 (Payloads) |
| SSP 50200-07<br><a href="http://iss-www.jsc.nasa.gov/ss/issapt/pals">http://iss-www.jsc.nasa.gov/ss/issapt/pals</a>                                    | Station Program Implementation Plan, Volume 7: Training                                |
| SSP 50253<br><a href="http://kria.jsc.nasa.gov/DL2/s-poccb">http://kria.jsc.nasa.gov/DL2/s-poccb</a>   | Operations Data File Standards   |
| SSP 50313<br><a href="http://flight.jsc.nasa.gov/IDAGS/dgcs.html">http://flight.jsc.nasa.gov/IDAGS/dgcs.html</a>                                       | Display and Graphics Commonality Standards   |
| JSC 36301<br><a href="http://usa1.unitedspacealliance.com/sfocdata/jsc/jsc36301.pdf">http://usa1.unitedspacealliance.com/sfocdata/jsc/jsc36301.pdf</a> | International Space Station (ISS) Crew Training Catalog                                |
| JSC 36343<br><a href="http://139.169.159.8/IDAGS/jsc36343.html">http://139.169.159.8/IDAGS/jsc36343.html</a>   | ISS Graphics Training Products Development Manual                                      |
| JSC 36381<br><a href="http://kria.jsc.nasa.gov">http://kria.jsc.nasa.gov</a>   | Operations Local Area Network Interface Control Document                               |
| JSC 48531<br><a href="http://kria.jsc.nasa.gov">http://kria.jsc.nasa.gov</a>   | Station Support Computer Software Management Plan                                      |
| <a href="http://iss-www.jsc.nasa.gov/ss/issapt/lexicon/">http://iss-www.jsc.nasa.gov/ss/issapt/lexicon/</a>  | Lexicon  |
| <a href="http://msdn.microsoft.com/library">http://msdn.microsoft.com/library</a>  | Windows Interface Guidelines for Software Design (ISBN 1-55615-679-0)                  |

### **3.0 GENERIC OBT REQUIREMENTS**

The developing organization shall maintain and upgrade OBT lessons for the increments that the OBT supports.

#### **3.1 INSTRUCTIONAL REQUIREMENTS**

Each Partner shall ensure that all OBT Courseware is as follows: designed with user-centered and operationally-focused objectives; and validated for relevance, usability, and instructional design integrity as part of each IP training implementation plan before being submitted to the ITCB for approval.

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## **4.0 TRAINING REFERENCE MATERIALS**

### **4.1 <TBD 4-1>**

## **5.0 CBT**

### **5.1 USER REQUIREMENTS**

These requirements have been extracted from CB-99-085, Crew Consensus Report for Fundamental Requirements for International Space Station (ISS) Preflight and Onboard Computer-Based Training Products. Suggested approaches for Onboard Computer-Based Training (OCBT) lesson design and development implementation are addressed in the ISS Onboard Computer-Based Training Developer Guide **<TBD 2-1>**. In order to optimize crew learning efficiency and minimize the risk of operator error, these user requirements specify the use of current Microsoft Internet Explorer (IE) and Microsoft Windows standards and conventions in the design, development, and delivery of OCBT lessons.

This document may be used with the associated ISS Onboard Computer-Based Training Developer Guide **<TBD 2-1>**, which provides “best practice” suggestions or approaches for implementation. When this OCBT section is updated, the ISS Onboard Computer-Based Training Developer Guide **<TBD 2-1>**, will be revised accordingly.

OCBT lessons should be made available preflight via web-based technologies to the greatest extent possible. OCBT lessons should be designed to maximize user readability.

### **5.2 GENERAL REQUIREMENTS**

- A. OCBT products shall be a consistent set of lessons that can be easily used by crewmembers with average computer skills. Skill-based simulation products for onboard or ground-based training are outside the scope of this section.
- B. OCBT lesson navigation shall have the same general structure. This will allow exploration and trial use of one OCBT to provide a working familiarity for the rest.
- C. All OCBTs shall be accessible via a single menu system.
- D. A crewmember with familiarity of Windows and IE 5.0 along with its subsequent versions shall be able to use the products with no specialized training.
- E. The products shall be directed at typical crewmembers who have a working knowledge of Windows products and use Windows in their day-to-day activities. Crewmembers shall not be assumed to be computer specialists.
- F. OCBT lessons developed for ISS shall have consistent look, feel, and functionality as specified in this document.

### **5.2.1 SPECIFIC REQUIREMENTS**

- A. IE 5.0 and subsequent versions shall be the primary navigation for OCBT content. Functions specified by these requirements that cannot be met with native IE 5.0 and subsequent versions can be implemented with other embedded software code.
- B. OCBT lessons shall be delivered as a minimum in English. Soyuz OCBT will be delivered in Russian and English.
- C. OCBT lessons shall have an operational focus and be designed to meet the preflight and onboard needs of the crew.
- D. OCBT content shall be sufficient to permit the crew to execute the required task with the resources onboard the vehicle. Extraneous content irrelevant to this end shall be avoided.
- E. OCBT lessons shall have consistent stylistic features as defined in this requirement document.
- F. OCBT lesson content shall be consistent with JSC 36301, International Space Station (ISS) Crew Training Catalog, in areas such as the lesson title, code, synopsis, and training objectives, in order to permit crewmembers to anticipate what to expect in a lesson and where to find similar content when they explore a new lesson.
- G. OCBT lessons shall be constructed with consistent industry standard conventions (e.g., fonts, graphical file formats, graphics labeling, video formats, animation formats, audio formats, and hyperlinks).
- H. OCBT lessons shall be compatible with the constraints of the ISS computer network and laptops.
- I. OCBT lessons shall be designed to be upgradeable and adaptable. Maintainability shall not require recompilation beyond the page level.
- J. OCBT lessons shall provide a consistent navigation scheme that can be intuitively followed to reach all portions of the lesson.
- K. OCBT lessons shall adhere to standards in SSP 50313, Display and Graphics Commonality Standards, and in Windows Interface Guidelines for Software Design.
- L. The navigational framework shall be visible and accessible throughout the lesson. Any primary backbone page of the lesson shall be directly accessible.
- M. The navigational scheme shall provide forward and backward navigation through the user's navigational history, next and previous navigation through the lesson, and an indication of both the present location and the past navigational history.
- N. A bookmark function shall be provided.
- O. OCBT lessons shall minimize the number of user interactions (mouse-clicks) and mouse travel distances because of the difficulty of use in microgravity.

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- P. OCBT lessons shall restrict the use of logos (e.g., OCBT developer or discipline logos) to the title page and/or the about page.
- Q. Watermarks used in the OCBT lesson shall be displayed only on the title page.
- R. Although the mouse is the primary user input device, OCBT lessons shall provide a consistent set of “hot-keys” to permit mouse-less operations.
- S. OCBT lessons shall provide a search capability to permit rapid location of desired content. At a minimum, it shall include the page title and text from the primary backbone pages.
- T. OCBT lessons shall provide a glossary to permit the user rapid access to unfamiliar terminology and any acronyms used in the lesson.
- U. OCBT lessons containing Russian or English technical terminology shall be consistent with the ISS Lexicon.
- V. OCBT lessons shall provide a note-taking capability to allow the crew to build personal electronic and/or paper-based notes. Text and graphics can be printed from the OCBT lesson.
- W. OCBT lessons shall have a capability to print page content with navigational reference (e.g., page number and location within the context of the lesson).
- X. OCBT lesson synopses shall be incorporated into an OCBT reference database (see Appendix B).
- Y. OCBT lesson synopses shall be accessible through a global index and search capability to facilitate OCBT lesson content accessibility.

### **5.3 INSTRUCTIONAL REQUIREMENTS**

- A. OCBT lessons designed for first-time users shall include features to permit efficient access for proficiency and refresher training.
- B. OCBT lessons shall provide feedback to the learner that he/she has covered all the material required to meet the first-time or proficiency lesson objectives.
- C. If OCBT developers use flight procedures, they shall coordinate with the appropriate Operations Data File (ODF) organization and shall mark them for “Training Purposes Only.”

### **5.3.1 TESTS, QUIZZES, AND EXERCISES**

Tests, Quizzes, and Exercises (TQE) are not required to be included in the OCBT lessons. They may be used as tools to strengthen and reinforce the learning process or to challenge the student with respect to the fulfillment of the training objectives.

- A. TQE items may be placed at any location in the OCBT.
- B. TQE sessions shall not direct the lesson flow. Execution or completion of TQE shall not be mandatory for proceeding or accessing other portions of the OCBT.
- C. TQE items shall be independently selectable by the student.
- D. TQE shall provide the actual correct response if an incorrect response is given.
- E. TQE shall provide timely feedback for each progressive item or group of closely related items. This requirement may be disregarded if TQE are used for formally evaluating the student on the achievement of the training objectives.

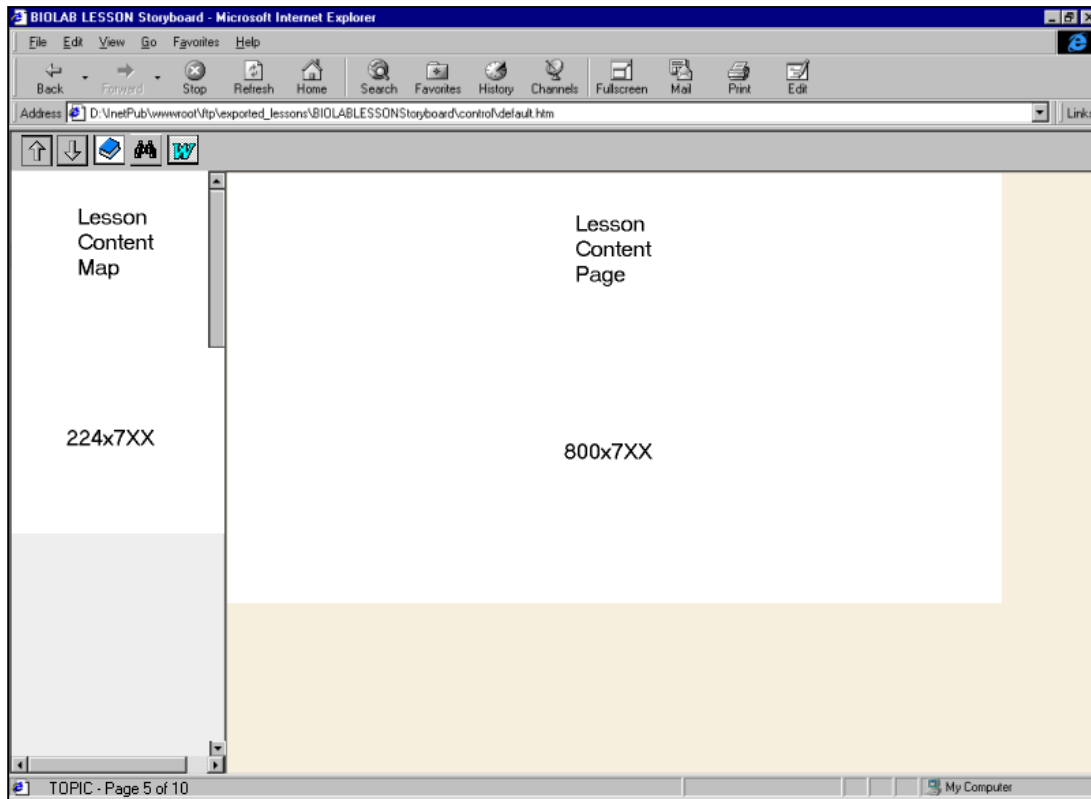
### **5.4 USER INTERFACE REQUIREMENTS**

#### **5.4.1 GENERIC USER INTERFACE REQUIREMENTS**

- A. Windows shall be re-sizeable.
- B. When windows are resized, lesson content shall not be corrupted.
- C. Intra-page navigation shall be limited to content within the page and not include links to other primary backbone pages. Intra-page navigation techniques shall be left to the lesson developer organization's professional judgment.
- D. The displayed page title and the HTML title tag should match the corresponding displayed page title in the lesson content map.
- E. OCBT lessons shall display a visible feedback, possibly an hourglass, when content is being loaded into the lesson and during any other system function that precludes user interaction.
- F. The OCBT lesson version and release date shall be included in the title page.

## **5.4.2 MINIMUM STANDARD INTERFACE**

Minimum Standard Interface for ISS OCBT is presented in Figure 5.4.2-1.








**FIGURE 5.4.2-1 MINIMUM STANDARD INTERFACE**

## **5.4.3 INTER-PAGE NAVIGATION**

- A. Inter-page navigation shall be limited to the use of the following functions or features:
1. Next (page), Previous (page).
  2. Back (history), Forward (history).
  3. Lesson content map.
  4. Search.
  5. Bookmark.
  6. Glossary.
- B. The active topic and current page of the total number of the pages in the topic shall be displayed at all times.
- C. The requirements for function keys are defined in Table 5.4.3-1.

**TABLE 5.4.3-1 FUNCTION KEYS**

| OCBT Navigation | Function  | Icon/Tools menu item   | Hot Key                    |
|-----------------|---|--|----------------------------|
| Previous        | Move to previous page in linear flow of lesson from currently displayed lesson page.  |   | * Alt + ↑                  |
| Next            | Move to next page in linear flow of lesson, from currently displayed lesson page.   |   | * Alt + ↓                  |
| Forward **      | **  | **   | * Alt + →<br>**            |
| Back **         | **  | **   | * Alt + ←<br>**            |
| Print **        | **  | **   | * Ctrl + P<br>**           |
| Glossary        | Permits the user rapid access to unfamiliar terminology and any acronyms used in the lesson.  |   | * Ctrl + G                 |
| Search          | Permits rapid location of desired content; the search capability as a minimum shall include page title and text from primary backbone pages.  |   | * Ctrl + K                 |
| Personal Notes  | Allows for note-taking capability for text and graphics, which can be extracted/printed from the OCBT lesson to allow the crew to build personal electronic and/or paper-based "crew note-books." |  | * Ctrl + J                 |
| Favorites **    | **  | **   | * Ctrl + D<br>**           |
| History **      | **  | **   | * F4 and/or Ctrl + H<br>** |

\* As soon as possible, the hot keys will be defined as Display and Graphics Commonality Standards (DGCS) standards.

\*\* Native Internet Explorer

#### 5.4.4 LESSON MAP CONTENT

- A. Lesson Content Map shall be the primary backbone page definition.
- B. The lesson content map shall:
  1. Indicate the current and previously viewed primary backbone pages.
  2. Allow user access to every primary backbone page.
  3. Use a collapsible, expandable, and indented map representing a hierarchical structure.
- C. The lesson content map shall be viewable at all times and be located on the left side of the page.

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- D. The lesson content map shall be horizontally re-sizeable.
- E. The lesson content map shall be horizontally and vertically scrollable.

#### **5.4.5 GLOSSARY**

- A. The user can access the glossary in the following ways:
  - 1. Using Ctrl + G for general use.
  - 2. Pressing the glossary button in the toolbar for general use.
- B. The glossary window shall be a secondary window controlled by the user (e.g., can be left open simultaneous to training, can be resized, etc.).
- C. The search button within glossary shall be **<TBD 5-1>**.
- D. The glossary shall enable the user to search for any term contained within the glossary via dynamic filter (e.g., IE Hyper Text Mark-up Language (html) help).

#### **5.4.6 SEARCH**

- A. The search capability shall allow the user to perform a Boolean search on the title or body text of pages.
- B. It shall be possible to navigate to a specific page from the entry found.
- C. When the search results are displayed, the keywords shall be highlighted.
- D. The search results shall remain intact until user intervention closes the window.

## 5.4.7 USER INTERACTION

Common user interactions are defined in Table 5.4.7-1.

**TABLE 5.4.7-1 USER INTERACTION**

| Type           | Definition   | Body of text   | Content Graphics      |
|----------------|--|--|-----------------------|
| Drag and Drop  | Windows UI   | Use clear directions.  | Use clear directions. |
| Click and Hold | Windows UI   | When click and hold interactions are included within the lesson, clear directions shall be provided to the user.   |                       |
| Rollover       | Body of text that causes something to occur on the screen when the cursor rolls over it. | Text shall be green except for acronyms. Only one of the following shades of green shall be used within a lesson (Hexadecimal 009900, Hexadecimal 339966, Hexadecimal 00CC33 or Hexadecimal 33FF00). |                       |
| Button         | Windows UI   | The state of a button shall change (e.g., depressed, grayed, highlighted, dotted lines, etc.) depending upon the interaction available to the user at that point in the lesson.                      |                       |
| Double Click   | Windows UI   | <TBD 5-2>  |                       |

- A. Underlined text shall be used exclusively for hyper-linking.
- B. The menu (drop-down, pull-down, pull-out, and scroll) shall follow Windows standard.
- C. The shape of the cursor shall change (e.g., pointing finger) when moved over a user interaction area within the content area of the page.
- D. Alert windows shall not be used for training purposes.

## 5.4.8 OCBT MEDIA SPECIFIC

- A. Video, within lesson pages, shall use the Station Support Computer (SSC) Windows Media Player to provide the following functionality: play, rewind, pause, and seek.
- B. Audio shall be optional except when used for essential critical content, such as Caution and Warning (C&W) tones.
- C. Audio within lesson pages shall provide controls as follows: play, rewind, and pause.
- D. OCBT lesson audio control shall not overwrite system audio control.
- E. When audio is used for essential learning content, the user shall have the capability to display text of the spoken words at user discretion.

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- F. Given 1024x768 resolution, body text and graphic text shall be no smaller than Arial 10-point type as printed on paper.
- G. OCBT lessons shall use SSC fonts.

### **5.5 SYSTEMS CONSTRAINTS**

JSC 36381, Operations Local Area Network Interface Control Document, provides information that is maintained on a regular basis by Station Portable Onboard Computer Control Board (S-POCCB) personnel.

- A. OCBT development will be limited by the SSC system capabilities and the operational environment onboard ISS **<TBR 5-1>**.
- B. All OCBT lessons are afforded the SSC software classification 4, as referenced in JSC 36381.
- C. All SSC installations are carried out by S-POCCB authorized personnel.
- D. The SSC monitor screen resolution is limited to 1024 x 768 pixels with 16-bit colors.
- E. Total hard drive space for OCBT lessons is limited and will be determined once a change request for hard drive space on the server is officially received by the S-POCCB.
- F. The Orbiter Communications Adapter (OCA) will be used for OCBT uplink and downlink.
- G. Autorun.exe is disabled for the SSC.

#### **5.5.1 LOCAL AREA NETWORK CONSTRAINTS**

- A. OCBT lesson construction shall reflect consideration that the onboard server memory is limited to 64 megabytes (mb).
- B. Considering bandwidth and throughput constraints, all OBT media shall run from a Compact Disk-Read Only Memory (CD-ROM) and not be networked to the Operations (OPS) Local Area Network (LAN).
- C. The SSC will connect to the OPS LAN, consisting of only wireless Radio Frequency (RF), via personal computer cards.
- D. Although advertised vendor throughput of the RF network is 1.6 Megabits per second (Mbps) (12 mb/min), it is expected that the actual data throughput rates, based on testing, will be in the 3.5 - 5.5 mb/min range, as referenced in JSC 36381.

## 5.6 SYSTEM REQUIREMENTS

### 5.6.1 GENERIC REQUIREMENTS

- A. The maximum load time for a page or display shall be five seconds after the CD-ROM starts to speed (this assumes that the OCBT lesson is the only application running from the CD-ROM drive of an increment-specific SSC configuration).
- B. The SSC shall be the delivery platform for all OCBT.
- C. OCBT lessons shall not install files on the SSC or change the SSC increment-specific load.
- D. All OCBT lessons shall be standalone and compatible with increment-specific SSC configuration **<TBR 5-2>**.
- E. OCBT lessons shall use <SSC drive letter>: \OBT\<Organization (ORG)>\<lesson name>\ for data saving. The use of IE 5.0 native data saving functions is **<TBD 5-3>**.
- F. The <SSC drive letter> used for the data saving directory path shall be configurable.

### 5.6.2 INTEGRATION REQUIREMENTS

- A. OCBT lessons shall be provided via CD-ROM, as specified by S-POCCB.
- B. The IP developer organization shall provide the OCBT master CD-ROM, To Be Determined (TBD) number of blank flight-certified CD-ROMs, and TBD copies of the OCBT CD-ROM for ground use.
- C. Non-flight copies of the OCBT CD-ROMs shall be labeled "Class 3, not for flight."
- D. OCBT lessons shall be provided with the following directory structure: <CD-ROM drive letter>: \OBT\<ORG>\<lesson name>\.
- E. The lesson executable or start file shall be stored in the following directory: <CD-ROM drive letter>: \OBT\<ORG>\<lesson name>\_start.htm.
- F. OCBT documentation for integration purposes shall be provided on the OCBT CD-ROM at the following directory: <CD-ROM drive letter>: \OBT\<ORG>\docs\<lesson name>\.
- G. The documentation provided shall be consistent with manifesting requirements as specified in **<TBD 5-4>**.
- H. Lesson synopsis shall be provided in the data format specified in Appendix B of this document.
- I. The stowage of OCBT CD-ROMs shall be coordinated through the manifest engineer.

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- J. The IP developing organization shall scan the OCBT CD-ROM for viruses and provide a report including, as a minimum, the scan result, software, software version, and virus signature file used.
- K. The IP developing organization shall complete a letter of compliance as required by S-POCCB.

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## **6.0 SIMULATOR MODELS**

### **6.1 <TBD 6-1>**

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## **7.0 PHYSICAL MODELS**

### **7.1 <TBD 7-1>**

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## **8.0 ELECTRONIC PERFORMANCE SUPPORT SYSTEMS**

### **8.1 <TBD 8-1>**

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## **9.0 VIDEOS/PHOTOS**

### **9.1 <TBD 9-1>**

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## **10.0 HANDOVERS**

### **10.1 <TBD 10-1>**

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## **11.0 TELETRAINING**

### **11.1 <TBD 11-1>**

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## **12.0 ONBOARD DRILLS/PRACTICAL EXERCISES**

### **12.1 <TBD 12-1>**

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## **13.0 ONBOARD OPERATIONAL EQUIPMENT**

### **13.1 <TBD 13-1>**

**APPENDIX A**  
**ACRONYMS AND ABBREVIATIONS**

**APPENDIX A - ACRONYMS AND ABBREVIATIONS**

|        |  |
|--------|--|
| ASI    | Agenzia Spaziale Italiana                      |
| C&W    | Caution and Warning                            |
| CBT    | Computer-Based Training                        |
| CD     | Compact Disk                                   |
| CDG    | Command and Data Group                         |
| CD-ROM | Compact Disk-Read Only Memory                  |
| CMG    | Control Moment Gyro                            |
| COSS   | Crew Orbital Support System                    |
| CSA    | Canadian Space Agency                          |
| CSG    | Crew Systems Group                             |
| CTG    | Communication and Tracking Group               |
| DGCS   | Display and Graphics Commonality Standards     |
| EA     | Electronics Assembly                           |
| ECG    | Environmental Control (and Life Support) Group |
| EPG    | Electrical Power Group                         |
| ESA    | European Space Agency                          |
| EVA    | Extravehicular Activity                        |
| EVG    | EVA Group                                      |
| GCTC   | Gagarin Cosmonaut Training Center              |
| GNC    | Guidance, Navigation, and Control              |
| HTML   | Hyper Text Mark-up Language                    |
| IDS    | Integrated Documentation Services              |
| IE     | Internet Explorer                              |
| IG     | Inner Gimbals                                  |
| IP     | International Partner                          |
| IPP    | International Partners and Participant         |
| ISS    | International Space Station                    |
| ITCB   | International Training Control Board           |
| JAMSS  | Japan Manned Space Systems Corporation         |
| JEM    | Japanese Experiment Module                     |
| JSC    | Johnson Space Center                           |
| LAN    | Local Area Network                             |
| mb     | megabytes                                      |
| Mbps   | Megabits per second                            |
| MCG    | Motion Control Group                           |
| min    | minute   |

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|         |   |
|---------|---|
| NASA    | National Aeronautics and Space Administration   |
| NASDA   | National Space Development Agency of Japan      |
| OBT     | Onboard Training                                |
| OBTWG   | Onboard Training Working Group                  |
| OCA     | Orbiter Communications Adapter                  |
| OCBT    | Onboard Computer-Based Training                 |
| ODF     | Operations Data File                            |
| OG      | Outer Gimbals                                   |
| OPS     | Operations                                      |
| ORG     | Organization                                    |
| PALS    | Program Automated Library System                |
| PL      | Payload   |
| PLG     | Payloads Group                                  |
| RBG     | Robotics Group                                  |
| RF      | Radio Frequency                                 |
| RSA     | Russian Space Agency                            |
| RSC-E   | Rocket Space Corporation-Energia                |
| SMG     | Structures and Mechanisms Group                 |
| S-POCCB | Station Portable Onboard Computer Control Board |
| SSC     | Station Support Computer                        |
| TBD     | To Be Determined                                |
| TBR     | To Be Resolved                                  |
| TCG     | Thermal Control Group                           |
| TQE     | Tests, Quizzes, and Exercises                   |
| TVG     | Transfer Vehicle Group                          |
| UI      | User Interface                                  |
| U.S.    | United States                                   |

**APPENDIX B**  
**OCBT LESSON SYNOPSIS REQUIREMENTS**

**TABLE OF CONTENTS**

| <b>PARAGRAPH</b> |  | <b>PAGE</b> |
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| B.3.0            | ADDITIONAL SEARCH WORDS - CONTENT .....                  | B-4         |
| B.4.0            | STANDARD HTML TAGS .....                                 | B-5         |
| B.5.0            | ISS ATTITUDE CONTROL SYSTEM MALFUNCTION PREPARATION..... | B-6         |

## **APPENDIX B - OCBT LESSON SYNOPSIS REQUIREMENTS**

### **B.1.0 GENERAL REQUIREMENTS**

- A. OCBT lesson synopsis shall be developed and delivered as an HTML file (i.e., page) with a .htm file extension.
- B. OCBT lesson synopsis HTML file size shall not exceed 75 Kilo-bits.
- C. OCBT lesson synopsis text content shall not exceed 400 words.
- D. OCBT lesson synopsis may include one image. The image shall be saved in a .jpg file format with the following characteristics:
  - 1. Image size - pixel dimension shall not exceed 320-pixels x 240-pixels at 75 dots per inch.
  - 2. File size - not to exceed 65K.
  - 3. File extension - .jpg.

### **B.2.0 OCBT LESSON SYNOPSIS - HTML REQUIRED TAGS**

- A. A META tag is required for the program to pull the system identifier and any additional key words to be added that are not in the synopsis.
- B. The OCBT lesson synopsis HTML file shall contain the following META tag:  
<META NAME = "Station System: system\_name" CONTENT = "CBT Words: keyword#1, keyword#2, etc.">.
- C. System Identifier - NAME = "Station System: system\_name."
  - 1. NAME = "Station System: system\_name" is required to preface the system identifier.
  - 2. Example: Use NAME = "Station System: Generic" to specify that the system is Generic.
- D. The system identifier shall use the Station Systems Groups identifier as called out below:
  - 1. CDG - Command and Data Group (includes C&W).
  - 2. CTG - Communication and Tracking Group.
  - 3. ECG - Environmental Control (and Life Support) Group.
  - 4. EPG - Electrical Power Group.
  - 5. MCG - Motion Control Group.
  - 6. SMG - Structures and Mechanisms Group.
  - 7. TCG - Thermal Control Group.

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8. CSG - Crew Systems Group.
9. EVG - Extravehicular Activity (EVA) Group.
10. PLG - Payloads Group.
11. RBG - Robotics Group.
12. TVG - Transfer Vehicle Group.

**B.3.0 ADDITIONAL SEARCH WORDS - CONTENT**

- A. CONTENT = "CBT Words:" is required to preface additional search words. It is an area of additional words where the crew may search and is not part of the synopsis text. Keywords are comma-delimited as in the example below. The crew has the option to search based on matching upper or lower case.

Example: CONTENT = "CBT Words: strategic, monitor, safety" is an example to add the words strategic, monitor, and safety to the search of this lesson synopsis. See examples below for placement of a CONTENT tag within the META tag.

- B. When the OCBT lesson synopsis is developed using a word processor, the META tag identified in the paragraph above shall be included in addition to the automatic inserted ones.
- C. The TITLE tag is required for the program to pull the title of the OCBT lesson. The OCBT lesson synopsis title shall not exceed 118 characters. See the example below for the use of the TITLE tag.
1. The example of a lesson named Guidance, Navigation, and Control (GNC) Refresher that is a systems OCBT lesson and adds the words strategic, monitor, and safety to the key word search follows below:

<HTML>

<HEAD>

<META HTTP-EQUIVALENT = "Content-Type" CONTENT = "text/html; charset = iso-8859-1">

<META NAME = "Station System:Systems"

CONTENT = "CBT Words:Strategic, monitor, safety">

<TITLE>GNC Refresher</TITLE>

</HEAD>

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2. The example of a word composer statement with the required META NAME and CONTENT follows:

<HTML>

<HEAD>

<META HTTP-EQUIVALENT = "Content-Type" CONTENT = "text/html; charset = windows-1252">

<META NAME = "Generator" CONTENT = "Microsoft Word 97">

<TITLE>Booster Refresher</TITLE>

<META NAME = "Station System:Generic" CONTENT = "CBT Words:Emergency, technique, hardware">

<META NAME = "Template" CONTENT = "C:\PROGRAM FILES\MSOFFICE\OFFICE\html.dot">

</HEAD>

**B.4.0 STANDARD HTML TAGS**

In following HTML standards, the tags listed above can be either upper or lower case characters.

An HTML template is provided to OCBT developers with ready-to-fill-in placeholders for OCBT lesson content information and a graphic image. Refer to the OCBT template at the OBTWG website.

## **B.5.0 ISS ATTITUDE CONTROL SYSTEM MALFUNCTION PREPARATION**

This lesson covers the following:

- A. Key malfunction scenarios for the Control Moment Gyro (CMG) system including failures affecting sensors, the power/data interfaces, the spin motor, spin bearing, and the Inner Gimbals (IG) and Outer Gimbals (OG).
- B. Failures within the Electronics Assembly (EA) of the CMG.
- C. Distinguishing characteristics of both minor and major failures within the United States (U.S.) subsystem.
- D. Covers the proper approaches to take in dealing with major failures of the CMGs or in the Russian Segment GNC.

**<TBD B-1>**

**APPENDIX C**  
**OCBT REQUIREMENTS COMPLIANCE MATRIX**

**APPENDIX C - OCBT REQUIREMENTS COMPLIANCE MATRIX**

Table C-1 may be used to track compliance with the OCBT section of the requirement document.

**TABLE C-1 OCBT REQUIREMENTS COMPLIANCE MATRIX (PAGE 1 OF 2)**

| Req. No. | Section Name                        | Compliance Result | Follow-up Action | Due Date for Follow Up Action | Comments and Justification |
|----------|-------------------------------------|-------------------|------------------|-------------------------------|----------------------------|
| 3        | Generic OBT Requirements            |                   |                  |                               |                            |
| 3.1      | Instructional Requirements          |                   |                  |                               |                            |
| 5.1      | User Requirements                   |                   |                  |                               |                            |
| 5.2      | General Requirements                |                   |                  |                               |                            |
| 5.2.1    | Specific Requirements               |                   |                  |                               |                            |
| 5.3      | Instructional Requirements          |                   |                  |                               |                            |
| 5.3.1    | TQE                                 |                   |                  |                               |                            |
| 5.4      | User Interface Requirements         |                   |                  |                               |                            |
| 5.4.1    | Generic User Interface Requirements |                   |                  |                               |                            |
| 5.4.2    | Minimum Standard Interface          |                   |                  |                               |                            |
| 5.4.3    | Intra-Page Navigation               |                   |                  |                               |                            |
| 5.4.4    | Lesson Content Map                  |                   |                  |                               |                            |
| 5.4.5    | Glossary                            |                   |                  |                               |                            |
| 5.4.6    | Search                              |                   |                  |                               |                            |
| 5.4.7    | User Interaction                    |                   |                  |                               |                            |

\*Yes = meets the requirement; No = does not meet the requirement; N/A = include explanation.

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**TABLE C-1 OCBT REQUIREMENTS COMPLIANCE MATRIX (PAGE 2 OF 2)**

| <b>Req. No.</b> | <b>Section Name</b>      | <b>Compliance Result</b> | <b>Follow-up Action</b> | <b>Due Date for Follow Up Action</b> | <b>Comments and Justification</b> |
|-----------------|--------------------------|--------------------------|-------------------------|--------------------------------------|-----------------------------------|
| 5.4.8           | OCBT Media Specific      |                          |                         |                                      |                                   |
| 5.5             | System Constraints       |                          |                         |                                      |                                   |
| 5.5.1           | LAN Constraints          |                          |                         |                                      |                                   |
| 5.6             | System Requirements      |                          |                         |                                      |                                   |
| 5.6.1           | Generic Requirements     |                          |                         |                                      |                                   |
| 5.6.2           | Integration Requirements |                          |                         |                                      |                                   |

\*Yes = meets the requirement; No = does not meet the requirement; N/A = include explanation.

**APPENDIX D**  
**MATRIX OF ITEMS TO BE RESOLVED**

## APPENDIX D - MATRIX OF ITEMS TO BE RESOLVED

Table D-1 lists the specific To Be Resolved (TBR) items in the document that are not yet known. The TBR is inserted as a placeholder wherever the required data is needed and is formatted in bold type within brackets. The TBR item is numbered based on the section where the first occurrence of the item is located as the first digit and a consecutive number as the second digit (i.e., **<TBR 4-1>** is the first undetermined item assigned in Section 4 of the document). As each TBR is solved, the updated text is inserted in each place that the TBR appears in the document and the item is removed from this table. As new TBR items are assigned, they will be added to this list in accordance with the above described numbering scheme. Original TBRs will not be renumbered.

**TABLE D-1 MATRIX OF ITEMS TO BE RESOLVED**

| <b>TBR</b> | <b>Section</b> | <b>Description</b>   |
|------------|----------------|--|
| 5-1        | 5.5            | Canadian Space Agency (CSA) would like clarification on the relationship between the CBT development timeline and the SSC baselining timeline. Differences can affect CBT development. |
| 5-2        | 5.6.1          | CSA would like clarification on the relationship between the CBT development timeline and the SSC baselining timeline. Differences can affect CBT development.                         |

**APPENDIX E**  
**MATRIX OF ITEMS TO BE DETERMINED**

## APPENDIX E - MATRIX OF ITEMS TO BE DETERMINED

Table E-2 lists the specific To Be Determined (TBD) issues in the document that are not yet known. The TBD is inserted as a placeholder wherever the required data is needed and is formatted in bold type within brackets. The TBD issue is numbered based on the section where the first occurrence of the issue is located as the first digit and a consecutive number as the second digit (i.e., **<TBD 4-1>** is the first unresolved issue assigned in Section 4 of the document). As each TBD is resolved, the updated text is inserted in each place that the TBD appears in the document and the issue is removed from this table. As new TBD issues are assigned, they will be added to this list in accordance with the above described numbering scheme. Original TBDs will not be renumbered.

**TABLE E-2 MATRIX OF ITEMS TO BE DETERMINED**

| <b>TBD</b> | <b>Section</b>       | <b>Description</b>   |
|------------|----------------------|--|
| 2-1        | 2.1, 5.1             | ISS Onboard Computer-Based Training Developer Guide.   |
| 2-2        | 2.2                  | Robotics OBT User Requirements Document.   |
| 4-1        | 4.1                  | Standard format and content for OBT Reference Material shall be described.                       |
| 5-1        | 5.4.5                | Glossary search button.  |
| 5-2        | Table 5.4.7-1, 5.6.1 | Body of text for a double click shall be provided.   |
| 5-3        | 5.6.1                | IE 5.0 native data saving functions shall be described.  |
| 5-4        | 5.6.2                | Documentation consistencies for manifesting requirements shall be described.                     |
| 6-1        | 6.1                  | Standard format and content for OBT Simulator Models shall be described.                         |
| 7-1        | 7.1                  | Standard format and content for OBT Physical Models shall be described.                          |
| 8-1        | 8.1                  | Standard format and content for OBT Electronic Performance Support System shall be described.    |
| 9-1        | 9.1                  | Standard format and content for OBT Videos/Photos shall be described.                            |
| 10-1       | 10.1                 | Standard format and content for OBT Handovers shall be described.                                |
| 11-1       | 11.1                 | Standard format and content for OBT via Teletraining shall be described.                         |
| 12-1       | 12.1                 | Standard format and content for OBT using Onboard Drills/Practical Exercises shall be described. |
| 13-1       | 13.1                 | Standard format and content for OBT using Onboard Operational Equipment shall be described.      |
| B-1        | B.5.0                | Reserved for pictures or graphics.   |